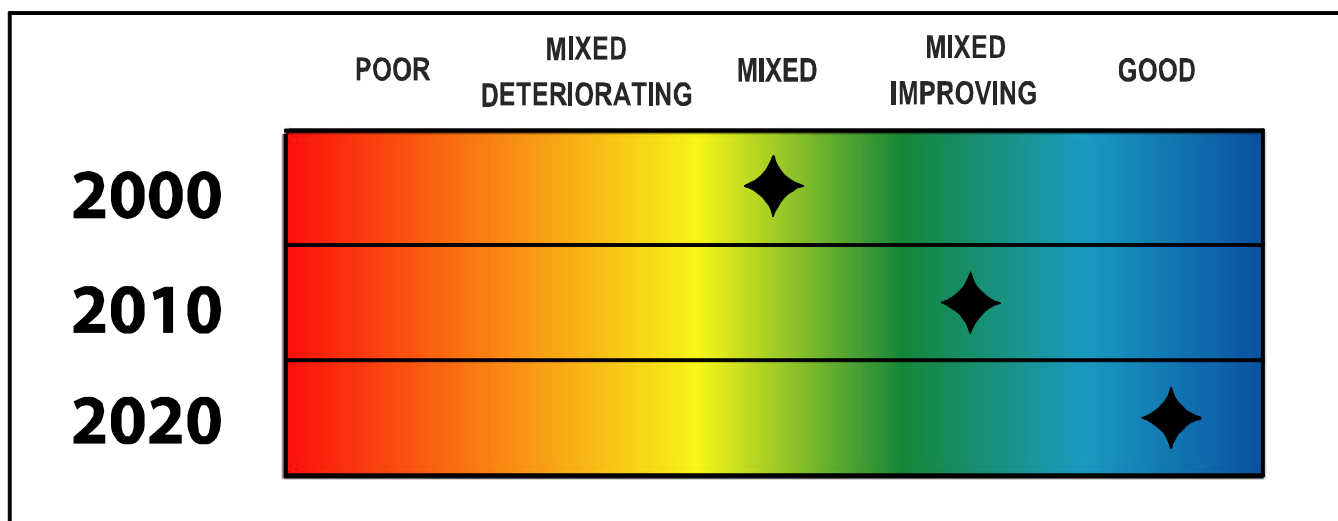


Subgoal 1

Can we all eat any fish?



Status

About 40 species of fish currently inhabit Lake Michigan, most of which are native to the lake. Over 43 percent of all Great Lakes fishing in the U.S. is done in Lake Michigan, and both commercial fishing and sport fishing are significant contributors to the economies of the states in the basin. Commercial fish production (both nontribal and tribal) reaches over 14.6 million pounds of fish annually.

While fishing is an important Lake Michigan resource, the need exists for all four Lake Michigan states to maintain advisories to warn the public about potential health effects resulting from consuming certain species of fish in the lake. As a result, achievement of the subgoal in Lake Michigan is mixed.

Challenges

- Determine the source of toxic atmospheric deposition to Lake Michigan.
- Secure resources to clean up contaminated sediment sites.
- Make fish consumption advisory data widely accessible and user-friendly.

Fish Consumption Advisories

Fishing is one of the most popular forms of outdoor recreation in the Midwest, and Americans are eating more fish as our diets shift toward more low-fat foods (for additional information, see <http://www.usda.gov/factbook/intro.htm>, which provides statistics on fish consumption). Fish consumption, however, has been shown to be a major pathway of human as well as wildlife exposure to persistent toxic substances, such as polychlorinated biphenyls (PCBs) and mercury. Contaminants released from many sources are transported through the environment and are carried into streams and lakes. Small organisms absorb these contaminants and are, in turn, eaten by other organisms and small fish. Some of these contaminants bioaccumulate in the fish –and in humans who eat them –to levels that can pose health risks.

State fish consumption advisories are issued to protect people from potential adverse health effects associated with contaminants found in fish. These advisories recommend amounts and types of fish that are safe to eat. Fish consumption advisories may also include information to educate the public on how to minimize exposure to certain contaminants through proper fish

preparation and cooking. The advisories are viewed as a temporary measure to protect the public while control measures and site cleanups reduce contamination to safe levels.

While fish are a good, low-fat source of nutrition, some individuals, particularly pregnant women, developing fetuses and young children, are more sensitive to contaminants than the general adult population. State fish consumption advisories include advice specifically targeted to these sensitive populations.

PCBs are the primary contaminant behind the fish consumption advisories published by all four Lake Michigan states. Other contaminants are present in fish at levels that do not require advice beyond the PCB-based advice. Mercury is also present in Lake Michigan fish advisories, and all four Lake Michigan states have issued warnings about the consumption of fish from inland waters as well.

Dioxins, chlordane, and DDT are also present in fish but rarely require advice more stringent than advice based on PCBs with the exception of dioxins/furans in some larger species.

States frequently use fish consumption advisories as indicators of whether their waters are meeting designated uses, triggering the need for investigation and setting a total maximum daily load (TMDL) for contaminants. TMDLs for PCB and mercury are therefore required for Lake Michigan. The fish consumption advisories are updated annually and can be found in the adjacent text box.

Mercury Advisories

Mercury is emerging as a growing concern in fish in Lake Michigan, inland lakes in the basin, and in the ocean. To address this concern, the states, U.S. Food and Drug Administration (FDA) and USEPA have issued advisories governing the consumption of fish.

Mercury is a metal that occurs naturally in small amounts in the environment. It also enters the environment from burning coal or trash which can then enter the food chain. Mercury gets into lakes and rivers in several ways, including rain and runoff.

Once released into the environment, inorganic mercury can be converted to organic mercury (methylmercury) which is the primary form that accumulates in fish and shellfish. Methylmercury biomagnifies up the food chain as it is passed from a lower food chain level to a subsequently higher food chain level through consumption of prey organisms or predators. Fish at the top of the aquatic food chain, such as pike and bass in lakes, and shark and swordfish in oceans, bioaccumulate methylmercury approximately 1 to 10 million times greater than dissolved methylmercury concentrations found in surrounding waters. Methylmercury is stored in the muscle of fish, the part of the fish people eat. Skinning and trimming the fish does not significantly reduce the mercury concentration in the fillet, nor is it removed by cooking processes. Because moisture is lost during cooking, the concentration of mercury after cooking is actually

higher than it is in the fresh uncooked fish. In contrast, PCBs adhere to fat, so the removal of skin and fat, as well as broiling the meat, removes up to 90 percent of the contamination.

States recommend that if a woman is pregnant or could become pregnant, if a woman is nursing or

Web Links for State Fish Consumption Advisories

Illinois: <http://www.idph.state.il.us/envhealth/factsheets/fishadv.htm>

Indiana: http://www.in.gov/isdh/programs/environmental/fa_links.htm

Michigan: <http://www.michigan.gov/mdch/0,1607,7-132--13110--,00.html>

Wisconsin: <http://www.dnr.wi.gov/org/water/fhp/fish/advisories>

A consolidated source for Great Lakes fish consumption advisories as well as information on other standards applicable to the lakes is available on a Great Lakes Information Network site:

<http://www.great-lakes.net/envt/flora-fauna/wildlife/fishadv.html>

in child-bearing years, consumption of freshwater sportfish caught by family and friends should be limited to one meal per week. For adults, one meal is 6 ounces of cooked fish or 8 ounces of uncooked fish; for a young child, one meal is 2 ounces of cooked fish or 3 ounces of uncooked fish.

The FDA has issued advice concerning mercury in commercial fish in stores and restaurants, which includes ocean and coastal fish as well as other types of commercial fish. FDA advises that women who are pregnant or could become pregnant, nursing mothers, and young children not eat shark, swordfish, king mackerel, or tilefish. FDA also advises that women of childbearing age and pregnant women may eat an average of 12 ounces of fish purchased in stores and restaurants each week. Therefore, if in a given week such a woman eats 12 ounces of cooked fish from a store or restaurant, she should not eat fish caught by her family or friends that week. It is important to control the total level of methylmercury consumed from all fish. EPA, FDA, and state officials are working together to ensure the advice is effective and gets to the appropriate audiences.

PCB Advisories

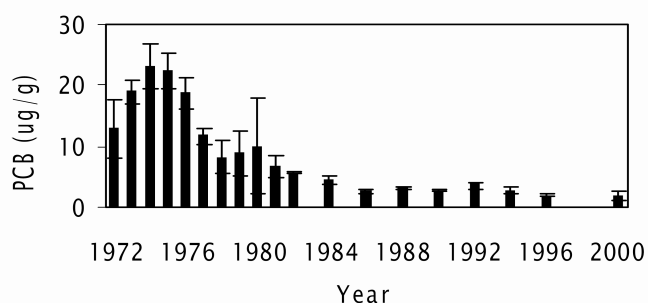
PCBs are a group of more than 200 similar man-made chemicals that were used as insulating fluid for electrical equipment like capacitors and transformers. They are oily liquids or solids, clear to yellow in color, with no smell or taste. More than 1 billion pounds of PCBs were manufactured in the United States. Because of the health effects associated with exposure, commercial production of PCBs ended in 1977. In 1979, the U.S. Environmental Protection Agency (USEPA) banned all use of PCBs; however, PCB removal or replacement was not required for equipment that already contained these chemicals and was in a closed system. PCBs are still present in many products made prior to 1979. Because these contaminants were used so widely and take a long time to break down, they can be found everywhere. PCBs accumulate in the fat of people and animals.

Developing a Lake Michigan Strategy for Impaired Waters

The purpose of this strategy is to outline a draft process to develop a collaborative Lake Michigan Strategy for Impaired Waters to reduce and virtually phase out the introduction and remediation of mercury, PCBs, and certain banned pesticides, which have resulted in fish consumption advisories, into the Lake Michigan ecosystem.

Although the States have primary responsibility for preparing Total Maximum Daily Loads (TMDL) for impaired water bodies, EPA has agreed to provide resources, technical assistance and facilitation to support the States' TMDL

PCBs in Lake Michigan Whole Lake Trout



Advisory level = .05 ug/g

Figure 1-1: PCBs in Lake Michigan Whole Lake Trout
Source: United State Geological Survey

development efforts on interstate waters like the Great Lakes. Furthermore, recent changes to EPA 303(d) list guidance allow the States to address impaired waters that are being remediated by other means in a manner that could delay or possibly eliminate the need for TMDL development.

This raises the question of what a strategy to address the impaired waters of Lake Michigan should be? Any strategy will take time to develop and implement. It should provide opportunities for the parties to work collaboratively and avoid duplication of effort. Such a strategy would be

useful to divide the development and possible products from the discussion into stages aligned with the LaMP publications from 2006 through 2010 (see Figure 1-2 for a comparison of the LaMP and TMDL processes). The stages could include activities and milestones tracked over time to ensure that progress is being made to remediate Lake Michigan. Any strategy would need to be reviewed and mid-course changes considered at each two year interval. If sufficient progress is not made by 2010, work on standard TMDLs for Lake Michigan would need to begin and be completed by 2013 per the current 303(d) schedule.

To implement this approach, the following activities should be conducted over the next two years:

- Introduce Strategy concept in LaMP 2004 (spring 2004)
- Finalize 2005 Intensive Lake Michigan Monitoring Plan and GLNPO Open Lake

- Organics monitoring (summer 2004)
- Present Lake Michigan Mass Balance models to states and stakeholders; Begin strategy discussion (fall 2004)
- Develop and share matrix of successful state programs (see appendix C for example) (spring 2005)
- Present strategy dialogue status at State of Lake Michigan Conference (fall 2005)
- If developed, propose strategy in LaMP 2006 (spring 2006)

The Lake Michigan LaMP 2000, Appendix E, provided an overview of issues and information needs for a full TMDL Strategy for Lake Michigan. LaMP 2002 summarized the dialogue and meetings since LaMP 2000 and provided an early draft of a Mercury Phase Out Proposal. LaMP 2002 also provided data from the Lake Michigan Mass Balance Study and Enhanced Tributary Monitoring Project.

Appendix C includes Pollutant Minimization

Fish Smart! Eat Safe!

PCB Risk Communication and Outreach Project

This two-year study and outreach campaign found that non-English-speaking urban fishers and their families may be at risk for excessive PCB exposure from consuming their catch because they have not heard about fish advisories for this contaminant.

Funded by a Persistent Bioaccumulative Toxics (PBT) Program regional project, researchers surveyed urban fishers at two Lake Michigan sites during the summers of 2002 and 2003, and developed several outreach tools during the second year to increase awareness of PCBs in the local catch. They also built relationships with local ethnic associations and health agencies to generate interest and possible assistance on this issue.

Among the findings were:

- 82% of the 217 respondents share their catch with family and friends.
- Among all fishers, 14% eat their catch once per month; 13% eat twice or more per month; and 33% eat their catch once per week or more often.
- 60% of Non-English speakers eat their catch once per week or more often; fish may be a larger part of their diet.
- Among all fishers, 41% have not heard of fish advisories; among Non-English speakers, 65% have not heard of them, which represents a significant difference.
- Non-English speakers may also have additional exposure based on the species they prefer to consume, and the cooking methods used.
- Finally 14% of all fishers reported consuming catfish and carp, neither of which should be consumed from Lake Michigan.

The researchers concluded that traditional fish advisories may not be reaching non-English speakers adequately. They identified several systemic factors contributing to this problem, and recommended steps to address them.

For details and additional information, please call Seth Dibblee, Toxics Program Section, University of Illinois-Chicago, at (312) 886-5992.

TMDL/LaMP Comparison

	TMDL	LaMP
Scope	Water body quality	Ecosystems/watersheds
Goals	State designated uses and standards	Adopted goals, beneficial uses
Problem Identification	Problem identification and documented source assessment	Problem identification and documented source assessment
Targets	Numerical targets for loadings	Endpoint target reductions and ecosystem objectives
Research and Development	Link targets/sources = load and waste load allocations	Link target/sources = projects
Tools/Impacts	Monitoring plan for stream reach	Ecosystem monitoring plan
Point Source	Permit limits (per effluent guidelines)	Indicators, compliance assistance projects
Non-point Sources	Voluntary (mandatory in Wisconsin or requires a cost share), best management practices, pollution prevention, education	Voluntary, best management practices, pollution prevention, education
Follow-up Plan	Permit/stream specific regulated entity	Sector specific, both public and private projects
Process	CWA, defined in regulation, technical calculation reviewed by EPA	CWA and GLWQA partnership approach to manage pollutants
Tribes	Must have treatment as a State-adopted water quality standards	LaMP committee membership

Figure 1-2 TMDL/LaMP Comparison

Program examples of state mercury reduction activities.

Pollutant Minimization Program

In addition the US EPA Region 5 Water division and states have reached agreement on a draft guidance document for the NPDES Permit Pollutant Minimization Program (PMP) for Mercury. The goal is to aid in meeting the Great Lakes Initiative water quality standards the states adopted for mercury in permits. The PMP guidance will be out for public comment in Summer 2004. contact gluckman.matthew@epa.gov or go to the Pretreatment Website at: <http://www.epa.gov/r5water/npdestek/npdprta.htm>

Next Steps

- Develop the Impaired Waters Strategy.
- Gather public comment on the Draft

Guidance for Mercury Pollutant Minimization Program during summer 2004.

- Cleanup of superfund sites and other PCB contaminated harbors

Long-Term Objectives

- By 2006, the Binational Toxics Strategy goals of 90 percent reduction of high-level PCBs, 75 percent reduction of total dioxin and furan releases, and 50 percent reduction of mercury use and release will be reached.
- By 2007, concentrations of PCBs in lake trout and walleye will be reduced by 25 percent. These results are based on early Lake Michigan Mass Balance model runs.
- In summer 2004, complete public comment draft Guidance for Mercury Pollutant Minimization Program, summer 2004.

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